

MEDICINAL PLANTS USED FOR RESPIRATORY DISEASE / PROBLEMS IN WEST BENGAL



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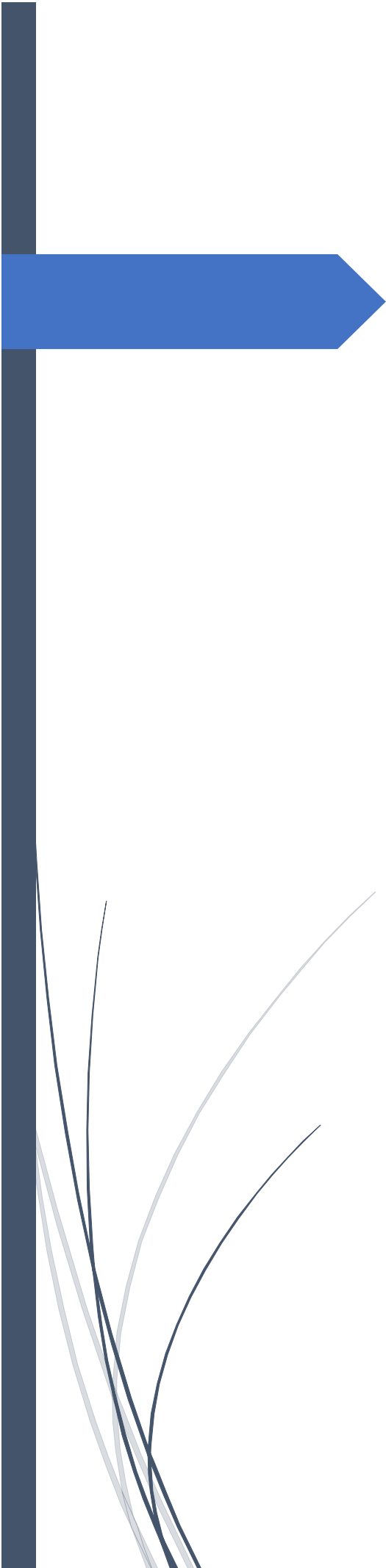
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Abstract:

This review article aims to explore the medicinal plant uses for respiratory diseases in the district of West Bengal, India. Respiratory diseases pose a significant burden on public health, and traditional medicine systems have long relied on plants to treat such conditions. The study involved a comprehensive review of literature, including ethnobotanical surveys, research articles, and traditional knowledge passed down through generations. The methods employed involved data collection, analysis, and synthesis to identify the most used medicinal plants for respiratory ailments. The findings highlight the rich diversity of plant species utilized by the local communities in West Bengal to manage respiratory diseases. The knowledge gained from this study could contribute to the development of novel therapeutic approaches and the conservation of traditional knowledge.

Key Words: Medicinal plant, respiratory disease, West Bengal

1.Introduction:

Respiratory related disease is one of the major causes of death and disability in the world and as per World Health Organization, about 3.8 million people faces death due to chronic respiratory diseases accounting to 9 % of the global death caused by noncommunicable diseases NCDs ([WHO, 2018](#)). More than 200 million suffer from chronic obstructive pulmonary disease (COPD) and about 65 million people endure severe to moderate pulmonary diseases including sleep disordered breathing, tuberculosis and pulmonary hypertension. Smoking, indoor air pollution from burning fuels, traffic and industrial sources are major contributors to these respiratory related ailments. Globally, about 14 % of children die of asthma annually and around nine million children under 5 years die of lung cancer ([Pearce et al., 2007](#); [Walker et al., 2013](#)). India bears 10.9 million deaths burden due to chronic respiratory diseases where 68.2 % are contributed through ambient particulate matter and around 27.6 % through household air pollution and solid fuel ([ICMR, 2017](#)).

Since the world's population is escalating rapidly, the demand for medicines have also increased at an alarming rate. However, people from far flung and rural areas still lack proper health facility and are dependent on traditional beliefs of medicine practice that play a significant role in their primary health care system (Vijai et.al., 2009).

The native people of India are exploiting a number of herbal medicines and a major percent of them take the help of local practitioners for effective treatment of various diseases (Hemadri, 1994; Murthy and Vidyasagar, 2013). The knowledge of ethnobotany and ethnobotanical practices has played a pivotal role in the development of several modern drugs (Cox, 2000) and especially in the developing countries, about 70- 80 % of the people from rural areas are dependent on medicinal plants for treatments of diseases (Unnikrishnan, 2010).

Plants, either as indigenous therapy or isolated active principles, have served as a common source of medicine (Farnsworth et al., 1985). To alleviate human suffering, plants have played a major role in traditional as well as in modern medicine (Akerele, 1993). Indigenous ethnopharmacology has been considered as an important tool in the discovery of new drugs (Cox, 1990; Farnsworth, 1990; Fabricant and Farnsworth, 2001). Herbal medicines are a popular form of complementary and alternative medicine practiced throughout the world in the treatment of various types of ailments.

Medicinal plants have been extensively used for treating a variety of infectious diseases for a long time. Drug discovery from these plants involves a versatile approach combining phytochemical, botanical, and molecular techniques. A broad range of active **phytochemicals**, like **alkaloids, flavonoids, proteins, extracted from herbal plants**, and some **volatile essential oils extracted from culinary herbs, herbal teas, and spices** possess antiviral property. Medicinal plants have proven to be potent sources of antiviral agents with some main advantages over conventional drug therapy due to their broad healing potency and causing no side effects.

1.1 Medicinal plants & its active principles:

A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. Medicinal plants also called medicinal herbs which synthesize hundreds of chemical compounds for various function including defence and protection against bacteria, viral, insect, fungi diseases and herbivorous mammals.

The active principles or constituents (phytochemicals) in medicinal plants are chemical compounds known as secondary plant products. Some secondary products discourage herbivores; others inhibit bacterial or fungal pathogens. Active principles in medicinal plants may affect health and non-essential nutrients as our diet does not require them to sustain life in the same way as vitamins and minerals. Active components are substance which are found in different parts of organs of plants which change or modify the functions of human and animal organ and system. There are huge variety of active components of which most important are **secondary metabolites** such are alkaloids, essential oils, glycolipids, and phenolics. Pharmaceutical activity in plant-based drugs is centred on the chemicals compounds which we called active compounds. There are many classification (according to chemical structure, origin, action) but according to chemical structure they are: glycosides, phenolics, terpenoids and alkaloids.

1.2 Secondary metabolites used for respiratory

Disease:

The importance of natural products in medicine in particularly secondary metabolites used for the treatment of diseases and drug development has been obvious for several thousand years. Study showed plant alkaloids inhibiting membrane fusion mediated by calcium and fragments of SARS-CoV / SARS-CoV-2 fusion peptides in search of rationalization of the antiviral actions of plants alkaloids.

(a) TERPENOIDS:

Terpenes have been shown to have anti-microbial activity or the capacity to kill or stop the growth of microorganisms. The accompanying plants produce terpenes (β - Caryophyllene) that have antimicrobial potential: *Syzygium cuminii* (jamun), *Cuminum cyminum* (cumin), *Piper nigrum* (black pepper). At present they are professed to inhibit fraction dependent proliferation of **lung carcinomas**.

(b) Phenolics:

Phenolic compounds show **anti-microbial** activity against potential respiratory pathogens. gram negative bacteria were more susceptible than gram positive bacteria to the action of phenolic compounds. However, the effect were species dependent. Respiratory infections such as: **influenza virus, corona virus (SARS-Covid, MARS – Covid), rhino virus** are being treated with phenolic compounds. Accompanying plants producing phenolics are: *Bombax ceibal*(shimul), *Euphorbia splendens* (crown of throne) etc.

(c)Alkaloids:

Many plants derived alkaloids used for medicinal purpose from the ancient period. Major alkaloids isolated from plants include active molecules with powerful effects include **lung disease**, such as **vincristine, vinblastine** and others *Catharanthus roseus* (*noyon tara*) and **reserpine** from the species *Rauwolfia serpentine* (Sarpa Gandha). Additionally, *Alstonia scholaris* (chhatim) a plant from the Apocynaceae family, has been used to treat **COPD, asthma, phlegm, and cough**. **Vinflunine, vinorelbine, jerantinines, vobtusine, and vincristine** are among the most prominent indole alkaloidal compounds, which all show potential benefits for the treatment of patients with **pulmonary diseases, such as tuberculosis, asthma, emphysema, pulmonary fibrosis, and cancer**.

(d) Glycosides:

Glycosides are one of the essential secondary biochemical that are derived from plant metabolism.

1.2.1 Types of respiratory disease:

I. COPD:

Chronic obstructive pulmonary disease, or COPD, refers to a group of diseases that cause airflow blockage and breathing-related problems. It includes emphysema and chronic bronchitis.

II. Cough:

Cough is an effort of the lung to throw the injurious matters, accompanied by harsh sound from throat. Violent cough, throat irritation and sometimes fever are some of the main symptoms of cough. About 200 gm leaves of *Adhatoda vasica* (Adufs), 100 gm dry seeds of *Moringa olecifera* (Munaga), 50 gm leaves of *Ocimum sanctum* (Tulsi) and 25 gm *Piper longum* (Pepper) are taken and a decoction is made by boiling them in water. Two teaspoonful of this decoction is consumed three times in a day. Likewise, equal amount of *Allium cepa* (Onion) juice and honey mixed together and 20 ml suggested daily at bedtime.

III. Whooping Cough:

It is a troublesome disease, often epidemic among children. Characteristic sign is occurrence of cough in paroxysms consisting of a series of short expiratory puffs followed by deep inspiration of air through contracted cleft of the glottis. Dried leaves powder of *Adhatoda vasica* (Asusa) and seeds powder of *Piper longum* (Pepper) mixed in a ratio of 100 gm: 25 gm and make the small pills by adding 30 gm jaggery. Two pills three times in a day is an excellent remedy for whooping cough.

IV. Asthma:

asthmatic attacks Asthma is a troublesome and non-curable disease. Difficulty in breathing, heaviness in chest and restlessness are some of its main symptoms. Some people are hypersensitive to certain substances viz., air, dust, hairs, pollens, fibres etc. and get frequently. Medicinal plants like rhizome of *Acorus calamus*, leaf of *Adhatoda vasica*, plant of *Boerhaavia diffusa* L., leaf of *Ocimum sanctum* L. are used.

V. Bronchitis:

Bronchitis occurs due to inflammation of bronchi of respiratory system. Vigorous and persistent cough with thick viscid and purulent phlegm are its main symptoms. In acute conditions it may lead to breathlessness due to sticking of phlegm in the bronchioles. A decoction used in the treatment of asthma is also suggested in bronchitis. Along with this, an herbal powder made by bark of *Acacia arabica* (Babool), stem of *Tinospora cordifolia* (Giloya) and dried roots of *Withania somnifera* (Ashwagandha) is given two teaspoonful three times in a day) for fast recovery.

VI. Common cold:

Despite great advances in medicine, the common cold continues to be a great burden on society in terms of human suffering and economic losses. Of the several viruses that cause the disease, the role of rhinoviruses is most prominent. The common cold is a conventional term for a mild upper respiratory illness, the hallmark symptoms of which are nasal stuffiness and discharge, sneezing, sore throat, and cough. Although the term tends to imply that there is a single cause for the illness, the common cold is actually a heterogeneous group of diseases caused by numerous viruses that belong to several different families. The common cold is usually a self-limited illness confined to the upper respiratory tract. However, in some patients the viral infection spreads to adjacent organs, resulting in different clinical manifestations, and, occasionally, colds predispose to bacterial complications. As herbal ingredients form the core component of these systems, we evaluate four herbs used in the treatment of common cold symptoms: ginger (*Zingiber officinale*), liquorice (*Glycyrrhiza glabra*), turmeric (*Curcuma longa*) and peppermint (*Menthae piperitae*).

VII. Pneumonia:

Pneumonia is a serious infection of the lungs caused by various bacteria, viruses and fungi. It can be mild and sometimes even prove fatal. It affects people with weakened immune systems, older people above 65 years of age, infants and young children. Pneumonia can be bacterial, viral or mycoplasma. It is a serious health issue and requires proper treatment.

(a) Bacterial Pneumonia:

The most common bacteria causing pneumonia is *Streptococcus pneumoniae*. It occurs in people with an existing lung disorder, and also those who drink excessively because of which they develop a weaker immune system. It also affects old people whose [immunity](#) weakens with increasing age.

(b) Viral Pneumonia:

It is caused by various viruses such as the influenza virus. More than 1/3rd of pneumonia cases is caused by viruses.

(c) Mycoplasma Pneumonia:

This is known as atypical pneumonia and shows different symptoms. It is caused by *Mycoplasma pneumoniae* and causes mild pneumonia that affects all age groups.

(d) Other Pneumonia:

These are less common and can be caused by other infectious agents such as **fungi**.

Centella asiatica, *Hydrocotyle sibthorpioides*, *Leucas indica*, *Scoparia dulcis* and *Bambusa* spp. are used in the different formulations of pneumonia.

VIII. Influenza:

Influenza is a communicable [viral](#) disease that affects the upper and lower respiratory tract. Symptoms of influenza include: Runny nose; High fever; Cough; Sore throat. A wide spectrum of influenza viruses causes it. Some of these viruses can infect humans, and some are specific to different species. Influenza viruses:

- Transmissible through respiratory droplets expelled from the mouth and respiratory system during coughing, talking, and sneezing.
- Can be transmitted by touching inanimate objects soiled with the virus and touching the nose or eye.

- Can be transmitted before the patient is symptomatic and until 5 to 7 days after infection.
- Take a few days for most of the healthy patients to recover fully from.
- Complications (e.g. [pneumonia](#) and death) are common in certain high-risk groups e.g. young children, the [elderly](#), [immunocompromised](#), and pregnant females.
- As herbal ingredients form the core component of these systems, we evaluate four herbs used in the treatment of influenza symptoms: *Solanum virginianum* L. (kantakari), *Cinnamomum tamala* (Tejpata), *Zingiber officinale* Roscoe (Aada)

1.3 Medicinal plants with potent antiviral properties:

Viral respiratory infections are one of the most prevalent causes of medical consultations globally. Known for a variety of clinical pictures, from self-limiting upper respiratory tract disease to life threatening ones, these infections deeply influence the quality of life and have noticeable economic burden. Respiratory syncytial virus, influenza virus, parainfluenza virus, rhinoviruses are respiratory virus that are associated with epidemic and endemic infections in all continents. Medicinal plants are increasingly being suggested as suitable alternative sources of viral agents. Here is example of medicinal plants with antiviral properties which are commonly recognized:

Zingiber officinale:

Zingiber officinale (family Zingiberaceae) is a dietary component that is commonly known as ginger. The **rhizome** of this herbal plant has been extensively used in the treatment of **colds, asthma, and bronchitis**. The **essential oil** of ginger is called **Gingerol**, which can be subdivided into gingerols, shogaols, paradols, zingerones, gingerdiones, and gingerdiols.



Fig: 1 *Zingiber officinale*

Allium sativum:

Allium sativum, also known as garlic, one of the most common herbal remedies used in human history, dates back to ancient cultures. The main bioactive compound of the *A. sativum* is allicin, and garlic extract with the allicin has been shown **antiviral activities** in vitro and in vivo due to **sulphur-containing compounds** such as **allicin, diallyl disulfide, and diallyl trisulfide** that react with thiol groups of various enzymes which are critical for microorganism surveillance. *A. sativum* has performed an antiviral effect against **coronavirus** species, **human rhinovirus**.



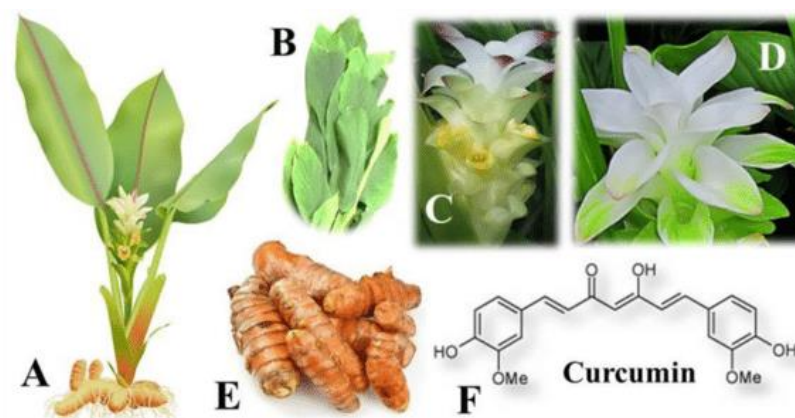
Fig: 2 *Allium sativum*

Glycyrrhiza glabra:

Glycyrrhiza glabra (family Fabaceae), commonly known as liquorice, an herbaceous perennial and has been used as a flavouring agent in foods and medicinal remedies for thousands of years. **Liquorice root** has been extensively used around the world to treat **cough** since ancient times. It contains active compounds, which include **glycyrrhizin, glycyrrhetic acid, flavonoids, isoflavonoids, and chalcones**. Glycyrrhizin and glycyrrhetic acid are the main active components and are potent inhibitors of cortisol metabolism due to their steroid-like structures. The **root** of <https://herbal-creations.com/glycyrrhiza-glabra-uses-side-effects/> this plant has been used for **cough, colds, asthma, and COPD**. Glycyrrhizin is a triterpene glycoside, a major active constituent obtained from the plant *G. glabra*. Isoliquiritigenin, a flavonoid isolated from the *G. glabra* roots, relaxed the tracheal smooth muscle of guinea pigs in-vitro and in-vivo. The effects of **glycyrrhetic acid** and **liquiritigenin (a flavonoid of liquorice root)** on **asthma** have been tested both in-vivo and invitro.



Fig: 3 *Glycyrrhiza glabra*



Curcuma longa:

Fig: 4 Curcuma longa

Curcumin is a polyphenolic compound obtained from the plant *Curcuma longa* (family Zingiberaceae), known as turmeric, and has been used since age-old. Curcumin has been shown to have **antiasthmatic** effects in both in vivo and in vitro studies. In an OVA-induced asthma model in guinea pigs, curcumin treatment during OVA sensitization showed significant protective effects through attenuation of bronchial constriction and hyper reactivity. This indicated that curcumin had both **preventive and therapeutic** effects on **asthma** that were attributed to the suppression of ions and subsequent no production, inhibition of inflammatory cytokine synthesis, and down regulation of eosinophil recruitment to airway.

Phyllanthus emblica:

Phyllanthus emblica (family Phyllanthaceae) is a **fruit**, highly nutritious and an important source of **vit C**. The isolated components of this plant include phenolic compounds, tannins, phyllembelic acid, phyllembelin, rutin, curcuminoids and emblicol. It helps to eradicate the problems of **cough, cold and asthma**.



Fig: 5 Phyllanthus emblica

Tamarindus indica:

The well-known food **vegetable** and medicinal plant of *Tamarindus indica* Linn (family Fabaceae) used to cure asthma as traditional medicine. The **phytoconstituents isolated from the pulp** of *T. indica* are flavonoid, tannin, and saponin. The methanolic extract of leaves of *T. indica* shows promising activity towards **asthma**.



Fig: 6 Tamarindus indica

Terminalia arjuna:

The **fresh bark** extract of *Terminalia arjuna* (family Combretaceae) has a potent **anti-asthmatic** effect by combinational preparation with some of the other medicinal plants as traditional medicine. The phytoconstituents of *Terminalia arjuna* includes arjunic acid, arjungenin, arjunetin and arjunoglucoside and oleanane-type triterpene glycosides.



Fig:7 Terminalia arjuna

Syzygium aromaticum:

Clove oil clear respiratory passages, acting as an expectorant for treating many upper-respiratory conditions including colds, eye sties, bronchitis, sinus conditions, cough and asthma. One of the studies showed that the essential oil possesses significant antiinflammatory effect. Clove has been used in traditional public medicine to relieve nasal obstruction and musculoskeletal pain which implies its anti-inflammatory activity and the activity is due to COX-2 inhibition [73]. The aromatic oil, when inhaled, can help relieve certain respiratory conditions like coughs, colds, asthma, bronchitis and sinusitis. Clove also contains a variety of flavonoids including kaempferol, rhamnetin and β caryophyllene which also contributed to its anti-inflammatory and antioxidant properties



Fig:8 Syzygium aromaticum

1.4. Medicinal plants with potent antibacterial properties:

The antibacterial properties of medicinal plants may be due to presence of different chemical agents which were classified as bioactive antimicrobial compounds (Arulmozhi et al., 2007). **Phytochemical constituents** such as **alkaloids, glycosides, flavonoids, tannins, steroids, terpenoids** and several other compounds are **secondary metabolites** of plants that serve as a defence mechanism against many **microorganisms, insects and other herbivores**. The present study also revealed the presence of medicinally active compounds like **alkaloids, glycosides, flavonoids, steroid, terpenoid** and **tannins** in most of the selected plants which could be responsible for the observed antibacterial property.

The main bacteria that can cause disease in the upper and lower respiratory tract are **Streptococcus pneumoniae** (a Gram-positive germ), **Haemophilus influenzae**, and **Moraxella catarrhalis** (Gram-negative germs). In addition, other Gram-negative germs (such as **Klebsiella pneumoniae, Chlamydia pneumoniae, Coxiella burnetti**, and **Bordetella pertussis**) and Gram-positive germs (**Streptococcus pyogens, Staphylococcus aureus**, and **Corynebacterium diphtheriae**) have a lower involvement in terms of incidence. Still, they are essential for defining the bacterial profile of respiratory disease. Plants can synthesize a significant number of **secondary metabolites**, which represents an effective method of combating pathogens. These metabolites have a diverse chemical structure that allows them to exert their antimicrobial effect through various mechanisms. They can act independently or synergistically or with other antibacterial agents (including antibiotics). Here is example of medicinal plants with antiviral properties which are commonly recognized:

Ocimum sanctum:

Ocimum sanctum (family Lamiaceae), commonly known as Tulsi, is an annual herb and has been used in the Indian traditional system of medicine. The **leaves** of this plant have been traditionally used for **cough, colds, asthma**, and **bronchitis**. The **active constituents** of *O. sanctum* isolated



Fig:9 *Ocimum sanctum*

are **eugenol**, **carvacrol**, and **caryophyllin**.

Mentha piperita:

Mentha piperita, a medicinally significant perennial herb belonging to the family Lamiaceae, usually termed peppermint, is the primary source of **peppermint essential oil** extracted from its aerial parts.

Peppermint essential oil comprises several bioactive compounds with menthone, menthol, menthofuran, and menthyl acetate forming the primary constituents, along with lower percentages of carotenes and flavonoids tannins and polyphenols (Singh et al., 2015). The **menthol**, in particular, has been found to exhibit **antibacterial activity** against both **Gram-positive** and **Gram-negative** bacteria. It helps to eradicate the problems of **Cough, asthma, pulmonary, emphysema, laryngitis, tonsillitis**.



Fig: 10 *Mentha piperita*

Justicia adhatoda:

Justicia adhatoda, popularly known as “vasaka” or is a common medicinal shrub belongs to the family Acanthaceae. It is a highly valuable Ayurvedic medicinal plant used as expectorant and antispasmodic and employed in the treatment of **cold, cough, asthma, and tuberculosis**. This species is found to be active against the **influenza type-B virus**. The **aqueous** and **methanolic extracts** interfere with the virus protein envelope, but only methanol extract can inhibit the infection by blocking the virus attachment. AV has an **anti-inflammatory** action on the **respiratory tract** and is effective in **respiratory tract infection**.

Owing to these activities, AV is effective in acute **asthma conditions**. The **leaves, roots, flowers, and bark** of this plant have been used in treatments of **cough, colds, asthma, to liquefy sputum**, as a **bronchodilator, bronchial catarrh, bronchitis, and tuberculosis**. A number of parts of the plant are commonly used in the forms of decoctions or powders.



Fig: 11 *Justicia adhatoda*

Bombax ceiba:

Bombax ceiba Linnaeus belongs to the family Bombacaceae which contains about 26 genera and nearly 140 pantropical species. It is commonly known as Semal, Simbal, Simul, Indian kapok, Katsavar, Indian bombax or Red Silk cotton tree. *B. ceiba* flowers have been shown to contain the **β -D' glucoside of β -sitosterol, free β -sitosterol, hentriacontane, hentriacontanol**, traces of an **essential oil, kaempferol** and **quercetin**. Plant extracts (**methanol** and **aqueous**) were assayed for their activity against multi-drug resistant *Salmonella typhi*. Strong **antibacterial** activity was shown by the methanol extracts of *Salmalia malabarica*.⁴⁵ Plant or plant parts were collected, dried, homogenized and extracted in two organic solvents viz. methanol and acetone. The **antibacterial** activity against *Klebsiella pneumoniae* was done by agar disc diffusion method. The activity was compared with standard antimicrobials Amikacin and Piperacillin.



Fig: 12 *Bombax ceiba*

Andrographis paniculata:

Andrographis paniculata (Burm. F.) Wall. Ex Nees (AP) also called Kalmegh or "King of Bitters" belongs to family Acanthaceae. It has been used for centuries in Asia to treat upper respiratory infections, fever, sore throat, and a variety of other chronic and infectious diseases. *A. paniculata* extracts and their bioactive molecules were investigated against a wide variety of pathogens, including several antibiotic-resistant species, for example, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Shigella* spp., *Salmonella* spp., *Candida* spp., *Streptococcus pneumoniae*. **Antimicrobial metabolites** were extracted from the **whole plant, aerial part, leaves and roots**. the potent inhibitory effect of ethanol extract of aerial parts on the growth of **both gram-positive and gram-negative bacteria**, namely, *Salmonella typhi*,



Fig: 13 *Andrographis paniculata*

Vibrio cholerae, *V. alginolyteus*, *Staphylococcus aureus*, *Shigella boydii*, *Shigella sonnei*, *Escherichia coli*, *Bacillus licheniformis*, and *Salmonella typhimurium*.

2. Materials & Methods:

To conduct this review, an extensive search was carried out using various databases, including **PubMed**, **Scopus**, **EBSCO**, **Google Scholar**, and relevant scientific journals. The search terms included "medicinal plants," "respiratory diseases," "West Bengal," and their combinations. Additionally, ethnobotanical surveys conducted in the region were examined to identify traditional plant-based remedies.

The collected data were analysed and synthesized to determine the most commonly used medicinal plants for respiratory diseases such as **Asthma**, **Collapse of part or all of the lung (pneumothorax or atelectasis)**, **Swelling and inflammation in the main passages (bronchial tubes) that carry air to the lungs (bronchitis)**, **COPD**, **lung infection (pneumonia)**, **abnormal buildup of fluid in the lungs (pulmonary oedema)** in district of West Bengal. Information regarding the plant species, traditional preparation methods, dosage, and reported therapeutic effects were extracted. The findings were critically evaluated and compared with existing scientific literature to identify potential correlations and gaps in knowledge.

Medicinal plants used for respiratory disease /problems in West Bengal investigation was carried out by analysing classical text books and peer reviewed papers, consulting worldwide accepted scientific databases. **Plants/their parts/extracts/polyherbal** studies for respiratory disease have been included in the review article. The profiles presented also include information about the scientific name. Research status of **344 potential plant species** has been discussed.

2.1. Study area: different district of West Bengal:

The West Bengal lies between 21°45' to 27° 16' N latitude and 85°55' to 89°56, E longitude, comprising of an area of 87,572 sq. km and is stretching between the high Himalayas in the north and rolling waves of Bay of Bengal in the south. Politically the state is bounded on the north by Sikkim and Bhutan, on the east by Assam and Bangladesh, southern boundary is delimited by the Bay of Bengal and the western side is bounded by the states of Orissa, Jharkhand, Bihar and Nepal. The major landmass of the state is 64,478,600 hectares and about 73.19% of the total area is under cultivation and the forest cover area of the state is estimated only 12000 sq. km. which is about 13.47% of the total land mass of the state. Geographically, the state is divided into 2-distinct natural geographical divisions viz.- the northern Himalayan division extended up to the Tarai division of north Bengal plains and the plains of south Bengal comprising of massive Gangetic delta, extending from West Dinajpur in the north to the intricate deltaic systems of the creeks of the south 24 parganas. According to Chaudhuri, Mallick and Sen (1962), the state belongs to lower part of the Ganga plain - which is a distinct phytogeographical region of India.

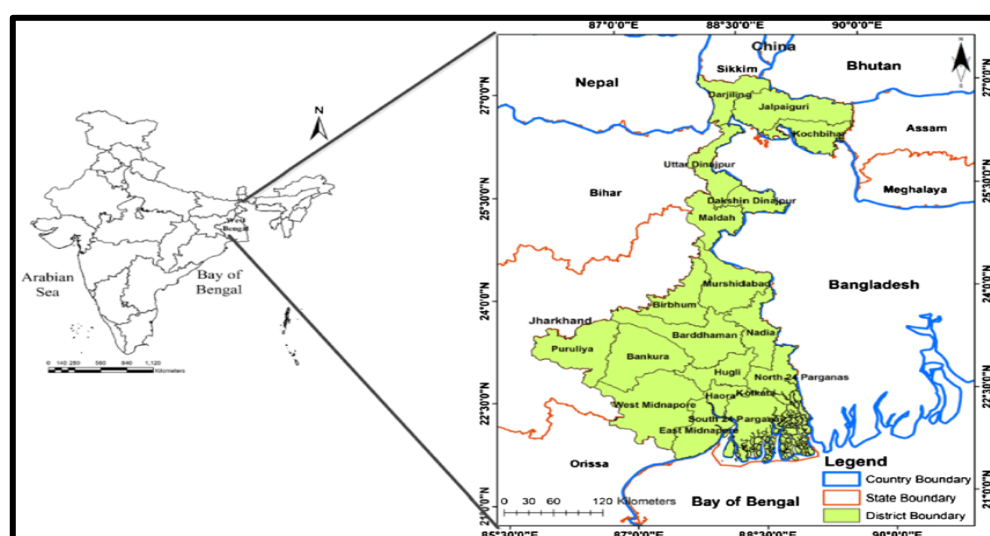


Figure 14: Map of study area

3. Results & Discussions:

The findings of this current review analysis of medicinal plants employed to address respiratory ailments in different districts of West Bengal have been synthesized in the following tables. According to the present study, a total of 344 species have been documented for their utilization in the treatment of respiratory diseases. These findings are consistent with earlier literature, reaffirming that these plants are prominently featured in traditional medicinal practices within 19 districts of West Bengal.

1. Hooghly

Sl No.	Scientific Name	Local name	Used parts	References
1.	<i>Solanum nigrum</i>	Kakmachhi	Fruit	(Chatterjee & Mukherjee, 2015)
2.	<i>Aerva aspera</i>	Apang	Root	
3.	<i>Heliotropium indicum</i>	Hatisur	Leaf	
4.	<i>Nymphaea rubra</i>	Lal saluki	Root	
5.	<i>Vitex negundo</i>	Nishinda	Leaves	
6.	<i>Mangifera indica</i>	Aam	Stem bark	
7.	<i>Terminalia arjuna</i>	Arjun	Stem bark	
8.	<i>Clerodendrum indicum</i>	Ghentu	Leaves	
9.	<i>Tamarindus indica</i>	Tentul	Seed	
10.	<i>Hibiscus mutabilis</i>	Sthalapadm	Leaves	
11.	<i>Lagenaria vulgaris</i>	Lau	Seed plup	
12.	<i>Trichosanthes dioica</i>	Patal	Leaves	
13.	<i>Plumeria alba</i>	Dolonchampa	Latex	
14.	<i>Eclipta prostrata</i>	Keshote	Whole Plant	
15.	<i>Cassia fistula</i>	Bandarlathi	Fruit	
16.	<i>Curcuma amada</i>	Aamada	Root	

Table 1: List of the medicinal plants from Hooghly district

2. North 24 Parganas

Sl No.	Scientific Name	Local name	Used parts	References
1.	<i>Achyranthes aspera</i>	Apang	Seeds	(Saha <i>et. al.</i> 2016)
2.	<i>Adhatoda zeylanica</i>	Basak	Leaf extract, Bark, Young Stem	
3.	<i>Aerva lanata</i>	Chaya	Whole Plant, Root	
4.	<i>Ammannia baccifera</i>	Dadmari	Leaves	
5.	<i>Andrographis paniculata</i>	Kalmegh	Leaves, Root	
6.	<i>Biophytum sensitivum</i>	Jhalai	Leaves	
7.	<i>Oxalis sensitive</i>	Bannaranga	Leaves	
8.	<i>Boerhaavia diffusa</i>	Punarnava	Roots, Leaf extract	
9.	<i>Brassica nigra</i>	Kalasarisha	Seeds	
10.	<i>Cajanus cajan</i>	Arhar	Seed, Leaves	
11.	<i>Heliopropium indicum</i>	Hatisur	Leaf, Root	
12.	<i>Ludwigia perennis</i>	Bonlong	Whole Plant	
13.	<i>Rumex vesicarius</i>	Chak	Leaves, Seeds	
14.	<i>Sonchus indicum</i>	Byakura, Gurkamai	Fruits, Roots	
14.	<i>Sonchus indicum</i>	Byakura, Gurkamai	Fruits, Roots	
16.	<i>Sonchus arvensis</i>	Banpalang	Roots	

Table 2: List of the medicinal plants from North 24 pargana district

3. South 24 Parganas

Sl No.	Scientific name	Local name	Used parts	References
1.	<i>Achyranthes asperal</i>	Chirchiri	Seed	(Naskar <i>et. al.</i> 2022)
2.	<i>Amaranthus spinosus</i>	Kantanotey	Young leaves, Shoot	
3.	<i>Andrographis paniculata</i>	Kalmegh	Whole plant, Leaves	
4.	<i>Bacopq monnieri</i>	Brahmi	Whole Plant, Leaves	
5.	<i>Blumea lacera</i>	Kukrondha	Whole Plant	
6.	<i>Boerhaavia diffusa</i>	Punornova or Godahapura	Whole Plant	
7.	<i>Bombax ceibal</i>	Polas Shimul	Root, Stem, Leaves, Gum	
8.	<i>Butea monosperma</i>	Polas	Flower, Seed, Bark	
9.	<i>Calotropis gigantea</i>	Akondo	Flower, Latex, Root	
10.	<i>Carapichea ipecacuanha</i>	Ipecac	Root	
11.	<i>Catharanthus roseus</i>	Noyontara	Root, Leaves	
12.	<i>Cayratia trifolia</i>	Amal-Bel	Root, Leaves	

13.	<i>Clitoria ternatea</i>	Aparajita	Root
14.	<i>Croton bonplandianus</i>	Bon tulsi	Leaves
15.	<i>Cynodon dactylon</i>	Durba	Whole Plant
16.	<i>Datura metal</i>	Dhutro	Seed, Leaves, Flower
17.	<i>Eclipta prostrata</i>	Bhringaraj	Leaves
18.	<i>Euphorbia hirta</i>	Dudhia	Whole Plant, Root
19.	<i>Ficus benghalensis</i>	Bot	Fruit, Bark
20.	<i>Ficus religiosa</i>	Asattha	Fruit, Bark
21.	<i>Heliotropium indicum</i>	Hathisur	Leaves, Root
22.	<i>Hygrophila auriculata</i>	Kulekhara	Root, Leaves
23.	<i>Lantana camara</i>	Lantana	Root, Leaves, Fruit
24.	<i>Mentha spicata</i>	Pudina	Leaves
25.	<i>Ocimum tenuiflorum</i>	Tulsi	Leaves
26.	<i>Oldenlandia corymbosa</i>	Pitpara	Whole Plant
27.	<i>Oxalis corniculata</i>	Amrul	Leaves
28.	<i>Saraca indica</i>	Ashok	Bark, Flower
29.	<i>Solanum torvum</i>	Tita begun	Fruit
30.	<i>Swertia chirayita</i>	Chirata	Stem, Leaves, Root
31.	<i>Tamarindus indica</i>	Tentul	Seed, Bark
32.	<i>Terminalia arjuna</i>	Arjun	Bark, Fruit
33.	<i>Tridax procumbens</i>	Tridaksha	Leaves
34.	<i>Vachellia nilotica</i>	Babla	Bark

Table 3: List of the medicinal plants from South 24 pargana district

4. Paschim Midnapur

Sl No.	Scientific Name	Local name	Used parts	References
1.	<i>Aegle marmelos</i>	Bel	Fruit	(Pattanayak <i>et. al.</i> 2015)
2.	<i>Cocculus villosus</i>	Do-doi/Dahi-anthi	Leaf extract	
3.	<i>Curcuma angustifolia</i>	Palo	Roots	
4.	<i>Hibiscus rosasinensis</i>	Jaba	Leaves	
5.	<i>Litsea gultinosa</i>	Maidalakdi	Leaves	
6.	<i>Phyllanthus amarus</i>	Bari amla	Root	
7.	<i>Syzygium cuminii</i>	Jamun	Bark	
8.	<i>Terminalia arjuna</i>	Arjun	Stem bark	

Table 4: List of the medicinal plants from Paschim Medinipur district

5. Purva Midnapur

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Acacia farnesiana</i>	Babla	Bark, Leaves, Heartwood, Flower	(Jana, 2016)
2.	<i>Datura innoxia</i>	Dhutra	Whole Plants, Roots, Leaves	
3.	<i>Datura metel</i>	Krishna Dhutra	Whole Plant, Roots, Leaves, Seeds, Fruits	
4.	<i>Hyptis suaveolens</i>	Ban Tulsi	Whole plant, Roots, Flowering Shoots, Leaves	
5.	<i>Lantana camara</i>	Chotra	Whole Plant	
6.	<i>Martynia annua</i>	Bagh Nakh	Leaves, Fruits	
7.	<i>Mimosa pudica</i>	Lajjavati	Whole Plant, Roots, Leaves	
8.	<i>Ocimum Americanum</i>	Babul Tulsi	Root, Leaves, Seeds	
9.	<i>Scoparia dulcis</i>	Ban Dhane	Leaves, Whole Plant, Roots, Seeds	
10.	<i>Opuntia stricta</i>	Fani Manasa	Whole Plant, Fruit, Milky Juice, Flower	
11.	<i>Oxalis corniculata</i>	Amrul	Leaves, Whole Plant	
12.	<i>Xanthium starmarium</i>	Jatafal	Roots, whole Plant, Leaves, Fruit, Seeds	

Table 5: List of the medicinal plants from Purba Medinipur district

6. Alipurduar

Sl No.	Scientific Name	Local Name	Used Parts	References
1.	<i>Justica adhatoda</i>	Asuro	Leaf extract	(Mondal <i>et.al.</i> 2022)
2.	<i>Tagetes eceta</i>	Chhoyptri	Leaf extract	
3.	<i>Acalypha indica</i>	Muktojhuri	Leaf extract	
4.	<i>Ocimum tenuiflorum</i>	Tulsi	Leaf extract	
5.	<i>P. langum</i>	Pipli	Dried fruit	

Table 6: List of the medicinal plants from Alipurduar district

7. Birbhum

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Justicecia adhatoda</i>	Basak	Leaf	(Koner & Mondal, 2021)
2.	<i>Centella asiatica</i>	Thankuni	Leaves	
3.	<i>Basella alba</i>	Puin Sak	Root, Leaf	
4.	<i>Ocimum sanctum</i>	Tulsi	Leaves	

Table 7: List of the medicinal plants from Birbhum district

8. Burdwan (East&West)

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Pithecellobium dulce</i>	Jilabli	Bark,	(Mondal <i>et. al.</i> 2015)
2.	<i>Zingiber officinale</i>	Ada	Root, Leaf	
3.	<i>Ambroma augustum</i>	Ashwagandha	Seed	
4.	<i>Spondias Mangifera</i>	Amra	Bark	
5.	<i>Solanum indicum</i>	Brihati	Whole Plant	
6.	<i>Cinnamon sp.</i>	Cinnamon Bark (Daruchini)	Bark	
7.	<i>Cinnamomum tamala</i>	Indian Bay leaf (Tejpatta)	Leaf	
8.	<i>Solanum nigrum</i>	Kakmachi	Root	
9.	<i>Dioscora sp.</i>	Chupri Alu	Tubers	
10.	<i>Coriandrum sativum</i>	Dhania	Seed	
11.	<i>Tamarindus indica</i>	Tentul	Bark	
12.	<i>Aerva aspera</i>	Apang	Young Leaf	
12.	<i>Aerva aspera</i>	Apang	Young Leaf	
13.	<i>Gloriosa superb</i>	Banhi Sikha	Rhizomes	
14.	<i>Glycyrrhiza glabra</i>	Jastho Madhu	Dried Root, Young leaf	
15.	<i>Gossypium sp.</i>	Tula	Root	
16.	<i>Boerhavia sp.</i>	Punarnaba	Root	
17.	<i>Cassia fistula</i>	Banarlathi	Leaf	
18.	<i>Hibiscus sp.</i>	Raktojoba	Bark	
19.	<i>Calotropis sp.</i>	Akanda	Root, Bark	
20.	<i>Punica granatum</i>	Dalim	Young Leaf	
21.	<i>Cucurbita maxima</i>	Misti Kumra	Dried Seed	

22.	<i>Cynodon dactylon</i>	Durba	Whole Plant
23.	<i>Euphorbia sp.</i>	Fani Manasa	Latex
24.	<i>Curcuma longa</i>	Turmeric	Rhizomes

Table 8: List of the medicinal plants from Undivided Bardhaman district

9. Jalpaiguri

Sl No.	Scientific Name	Local name	Used parts	References
1.	<i>Alstonia scholaris</i>	Chhatim	Bark, Leaves	(Saha. et al. 2013)
2.	<i>Andrographis paniculata</i>	Kalmegh	Whole Plant	
3.	<i>Bischofia javanica</i>	Kainjal	Leaves	
4.	<i>Calotropis gigantes</i>	Akanda	Whole Plant	
5.	<i>Cannabis sativa</i>	Bhang	Leaves, Inflorescence	
6.	<i>Centella asiatica</i>	Thankuni	Whole Plant	
7.	<i>Cinnamomum glanduliferum</i>	Malagiri	Seeds, Wood	
8.	<i>Citrus maxima</i>	Jambura	Fruits	
9.	<i>Datura metel</i>	Dhutro	Fruits	
10.	<i>Dillenia indica</i>	Chalta	Barks, Leaves, Fruits	
11.	<i>Drymaria cordata</i>	Abhijalo	Whole Plant	
12.	<i>Entada rheedii</i>	Gila	Seeds	
13.	<i>Ficus religiosa</i>	Pankur	Whole Plant	
14.	<i>Gynocardia odorata</i>	Chalmogra	Fruits, Seeds	
15.	<i>Holarrhena pubescens</i>	Kuchila	Bark, Stem, Latex	
16.	<i>Imperata cylindrica</i>	Kush	Whole Plant	
17.	<i>Justicia adhatoda</i>	Basak	Leaves	
18.	<i>Mimosa pudica</i>	Lajjabati	Leaves, Roots and Seeds	
19.	<i>Morinda angustifolia</i>	Haldikath	Leaves, Bark, Fruits, Roots	
20.	<i>Musa balbisiana</i>	Kala	Fruits, Stem, Roots	
21.	<i>Ocimum tenuiflorum</i>	Tulsi	Leaves, Seeds, Roots	
22.	<i>Oroxylum indicum</i>	Totala	Bark, Seeds	
23.	<i>Oxalis corniculata</i>	Ambalisak	Plants	
24.	<i>Phlogacanthus thyrsoiflorus</i>	Rambhang	Leaves, Bark, Flowers	
25.	<i>Physalis minima</i>	Bon Tepar	Whole plant	
26.	<i>Piper betleoides</i>	Bhote Pan	Leaves, Roots	
27.	<i>Piper peepuloides</i>	Pipul	Fruit	
28.	<i>Solanum americanum</i>	Kalabegun	Tender shoots	

Table 9: List of the medicinal plants from Jalpaiguri district

10. Kalimpong

Sl No.	Scientific Name	Local Name	Used part	References
1.	<i>Acorus calamus</i>	Bojo	Rhizome	(Chhetri <i>et. al.</i> 2018)
2.	<i>Albizia sp.</i>	Siris	Leaves, Bark, Seeds	
3.	<i>Alstonia scholaris</i>	Chatiwan	Bark, Root	
4.	<i>Amomum subulatum</i>	Alaichi	Seed, Root	
5.	<i>Ananas comosus</i>	Bhui Katahar	Leaves, Fruit	
6.	<i>Ageratum conyzoides</i>	Nambyu	Leaves	
7.	<i>Artemisia vulgaris</i>	Titey Pati	Leaves	
8.	<i>Bauhinia variegata</i>	Taaki	Root, leaves, Bark	
9.	<i>Bombax ceiba</i>	Simal	Gums, Root	
10.	<i>Callicarpa arborea</i>	Guyleo	Bark	
11.	<i>Carica papaya</i>	Mewa	Fruit	
12.	<i>Centella asiatica</i>	Gol Patta	Leaves	
13.	<i>Cheilocostus speciosus</i>	Betlauri	Rhizome, Stem	
14.	<i>Citrus medica</i>	Bimbira	Fruit	
15.	<i>Clematis buchananiana</i>	Pinasey Lahara	Root, Leaves	
16.	<i>Colocasia esculenta</i>	Pindalu	Tuber	
17.	<i>Cucumis sativus</i>	Saret	Fruit, Seed	
18.	<i>Cucurbita pepo</i>	Pharsi	Seed, Leaves	
19.	<i>Curcuma caesia</i>	Kalo Hardi	Rhizome	
20.	<i>Curcuma longa</i>	Hardi	Rhizome	
21.	<i>Cynodon dactylon</i>	Dubo	Whole Plant	
22.	<i>Datura mete</i>	Rinchen Nyongboou	Root, Leaves	
23.	<i>Eryngium foetidum</i>	Bhotey Dhaniya	Root, Leaves	
24.	<i>Entada gigas</i>	Pangra	Bark & Leaves	
25.	<i>Gynocardia odorata</i>	Gantey	Seed	
26.	<i>Heracleum annus</i>	Gham phul	Seed	

Table 10: List of the medicinal plants from Kalimpong district

11. Darjeeling

Sl No.	Scientific Name	Local Name	Used Parts	References
1.	<i>Spondias pinnata</i>	Amaro	Fruit, Bark	(Subba <i>et. al.</i> 2023)
2.	<i>Nasturtium officinale</i>	Simrayo	Whole plant	
3.	<i>Terminalia bellirica</i>	Barra	Fruit, Bark	
4.	<i>Ocimum tenuiflorum</i>	Tulsi	Leaf	
5.	<i>Perilla frutescens</i>	Silam	Seed	
6.	<i>Nephrolepis cordifolia</i>	Pani amala	Tuber	
7.	<i>Rubus paniculatus</i>	Bhui aiselu	Bark	
8.	<i>Mussaenda treutleri</i>	Sitalu	Root	
9.	<i>Houttuynia cordata</i>	Gandey ghar	Leaf	
10.	<i>Astilbe rivularis</i>	Bansupari	Root	
11.	<i>Bergenia ciliate</i>	Pakhanbed	Rhizome	
12.	<i>Curcuma longa</i>	Hardi	Rhizome	

Table 11: List of the medicinal plants from Darjeeling district

12. Jhargram

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Phyllanthus emblica</i>	Amlaki	Fruit	(Paul & Dey, 2022)
2.	<i>Terminalia bellirica</i>	Bahera	Fruit	
3.	<i>Pterocarpus marsupium</i>	Piyasal	Bark, Latex	
4.	<i>Millietia Pinnata</i>	Karanj, Dahar	Seed, Bark	
5.	<i>Holarrhena pubescens</i>	Kurchi	Bark	
6.	<i>Terminalia arjuna</i>	Arjun	Bark	
7.	<i>Scheichera oleosa</i>	Kusum	Fruit, Bark	
8.	<i>Cymbopogon schoenanthus</i>	Lemon Grass	Leaf	
9.	<i>Trewia nudiflora</i>	Pituli	Fruit, Leaf	
20.	<i>Terminalia chebula</i>	Haritaki	Fruit, Stem	
11.	<i>Hemidermus indicus</i>	Anantamul	Root	
12.	<i>Aegle marmelos</i>	Bel	Leaf, Root, Fruit	
13.	<i>Vitex negundo</i>	Nishinde	Latex, Leaves	
14.	<i>Cassia fistula</i>	Bandar Kathi	Leaves, Fruit	
15.	<i>Diopyros melanoxylon</i>	Kendu	Leaf, Root, Bark	
16.	<i>Shorea robusta</i>	Shal	Roots, Resin	
17.	<i>Madhuca longifolia</i>	Mohua	Flower, Bark	
18.	<i>Achyranthes aspera</i>	Apang	Whole Plant	
19.	<i>Andrographis paniculata</i>	Kalmegh	Leaf	

20.	<i>Enhydra fluctuans</i>	Hinchey	Whole Plant
21.	<i>Strychons nuxvomica</i>	Kuchila	Bark
22.	<i>Azadirachta indica</i>	Neem	Leaf, Fruit
23.	<i>Asparagus racemosus</i>	Shatamuli	Root
24.	<i>Cissus quadrangularis</i>	Hajor	Stem
25.	<i>Eclipta prostrate</i>	Keshut	Leaf

Table 12: List of the medicinal plants from Jhargram district

13. NADIA

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Acorus calamus</i>	Bach	Rhizome	(Banerjee, 2014)
2.	<i>Adhatoda vasica</i>	Vasaka	Leaves, Flowers, Fruits, Roots	
3.	<i>Allium sativum</i>	Rasun	Bulbs	
4.	<i>Curcuma longa</i>	Halud	Rhizomes	
5.	<i>Datura metel</i>	Dhutura	Whole Plant	
6.	<i>Embllica officinalis</i>	Amlaki	Fruits, Leaves, Tender Shoot	
7.	<i>Glycosmis pentaphylla</i>	Ashshoura	Whole Plant	
8.	<i>Piper longum</i>	Piplamul	Root, Fruit, Dried Spikes	
9.	<i>Solanum xanthocarpum</i>	Kantakari	Whole Plant	
10.	<i>Terminalia bellerica</i>	Behara	Fruit, Bark	
11.	<i>Zingiber officinale</i>	Ada	Rhizome	
12.	<i>Bacopa monnieri</i>	Brahmhi	Leaves	
13.	<i>Bauhinia variegata</i>	Kanchan	Roots, Leaves, Bark, Seeds	
14.	<i>Cleome viscosa</i>	Hulhuria	Whole Plant	
15.	<i>Costas speciosus</i>	Keu	Rhizomes	

Table 13: List of the medicinal plants from Nadia district

14. DAKSHIN DINAJPUR

SI No.	Scientific Name	Local Name	Used Part	References
1.	<i>Acharyanthus aspera</i>	Apang	Root	(Chowdhury <i>et.al.</i> 2021)
2.	<i>Artemisia vulgaris</i>	Nagdona	Leaf	
3.	<i>Blumea lacera</i>	Kukurmuta	Root	
4.	<i>Centella asiatica</i>	Dholamoni	Leaf	
5.	<i>Cissus quadrangularis</i>	Harjora	Whole Plant	
6.	<i>Coccinia grandis</i>	Telakucha	Leaf	
7.	<i>Cocculus hirsutus</i>	Fariboti	Leaf	
8.	<i>Coix lacryma-jobi</i>	Kanch	Root	
9.	<i>Costus speciosus</i>	Kuttus	Rhizome	
10.	<i>Createva religiosa</i>	Barun	Stem Bark	
11.	<i>Curculigo orchoides</i>	Talmuli	Root	
12.	<i>Cynodon dactylon</i>	Durba	Whole Plant	
13.	<i>Cyperus rotundus</i>	Mutha	Tuber	
14.	<i>Datura metel</i>	Dhutura	Leaf	
15.	<i>Deeringia amaranthoids</i>	Atmora	Stem	
16.	<i>Dioscorea alata</i>	Mach Alu	Rhizome	
17.	<i>Dregea volubilis</i>	Jukti	Stem	
18.	<i>Drynaria quercifolia</i>	Pokhiraj	Leaf	
19.	<i>Eleusine indica</i>	Kan Chulkani	Root	
20.	<i>Euphorbia hirta</i>	Dudh Kushi	Whole Plant	
21.	<i>Flacourtia indica</i>	Bainchi	Stem Bark	
22.	<i>Geodorum densiflorum</i>	Bon-Ada	Tuber	
23.	<i>Gloriosa superba</i>	Ulachanda	Root	
24.	<i>Glycosmis pentaphylla</i>	Atiswar	Root	
25.	<i>Heliotropium indicum</i>	Hatisur	Root	
26.	<i>Hibiscus rosa-sinensis</i>	Jaba	Leaf	

Table 14: List of the medicinal plants from Dakshin Dinajpur district

15. BANKURA

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Anisomeles indica</i>	Gopali, gobura	Whole Plant	(Sinha Babu & Banerjee,2013)
2.	<i>Coleus amboinicus</i>	Patharchhur, Lalimusli	Leaf Extract	
3.	<i>Coleus arometicus</i>	Karpuravalli	Leaf	
4.	<i>Hyptis suaveolens</i>	Bilatitulasi	Whole Plant	
5.	<i>Leonotics nepataefolia</i>	Bhutbhairab	Leaf	
6.	<i>Leonurus sibricus</i>	Raktadrone	Root	
7.	<i>Leucus cepholotes</i>	Bara Halkasha, Gouthi	Whole Plant	
8.	<i>Mentha Longifolia</i>	Jungipudina	Leaf Extract	
9.	<i>Mentha piperita</i>	Pudina	Leaf	
10.	<i>Ocimum gratissimum</i>	Ram Tulsi	Leaf	
11.	<i>Ocimum basilicum</i>	Bana Tulsi	Leaf	
12.	<i>Ocimum kilimandscharicum</i>	Karpurtulsi	Leaf	
13.	<i>Ocimum Tenuiflorum</i>	Tulsi	Whole plant	

Table 15: List of the medicinal plants from Bankura district

16. PURULIA

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Neium odorum</i>	Olender, Karabi	Bark paste	(Chakraborty & Bhattacharya,2005)
2.	<i>Terminalia arjun</i>	Arjuna	Bark	
3.	<i>Ziziphus jujuba</i>	Kul, Common, Jujube	Leaves	
4.	<i>Asparagus racemosus</i>	Shatamuli	Leaves	
5.	<i>Ocimum sanctum</i>	Tulsi	Leaves	
6.	<i>Annona squamosa</i>	Custard Apple	Seed	
7.	<i>Catharanthus roseus</i>	Vinca, Periwinkle	Leaves	
8.	<i>Togetas erecta</i>	Marigold	Leaves	
9.	<i>Canica papaya</i>	Papaya	Stem	
10.	<i>Butea monosperma</i>	Palash	Leaves	
11.	<i>Sesamum indicum</i>	Til	Leaves, Root	
12.	<i>Centella asiatica</i>	Thankuni	Leaves	
13.	<i>Calotropis procera</i>	Akanda	Root	
14.	<i>Shoera robusta</i>	Sal	Seed	
15.	<i>Phyllanthus niruri</i>	Bhui-amla	Whole Plant	

Table 16: List of the medicinal plants from Purulia district

17. Cooch Behar

Sl No.	Scientific Name	Local Name	Used Part	References
1.	<i>Adhatoda vasica</i>	Basak	Leaves	(Roy, 2015)
2.	<i>Andrographis paniculata</i>	Kalmegh	Leaves	
3.	<i>Bombax ceiba</i>	Shimuli	Spine	
4.	<i>Calotropis procera</i>	Akanda	Leaves	
5.	<i>Centella asiatica</i>	Bara manimuni	Whole plants	
6.	<i>Eclipta prostrata</i>	Kala Keshari	Leaves	
7.	<i>Glycosmis pentaphylla</i>	Matkila	Steam, Leaves	
8.	<i>Croton banplandianum</i>	Ban-Dakait	Leaves	
9.	<i>Drymeria diandra</i>	Hargila	Whole Plants	
10.	<i>Jatropha gossypifolia</i>	Bhendera	Latex	
11.	<i>Leucas aspera</i>	Dhupli	Young Plants, Leaves	
12.	<i>Moringa olifera</i>	Sajina	Leaves	
13.	<i>Psidium guajava</i>	Tam	Leaves	
14.	<i>Phylla Nodiflora</i>	Ban-okhra	Leaves	
15.	<i>Solanum nigrum</i>	Adh Bathua	Leaves	
16.	<i>Syzigium cumini</i>	Jamun	Dried Seed	
17.	<i>Tabernaemontana divaricata</i>	Sada Phul	Flower	
18.	<i>Tagetes patula</i>	Genda Phul	Leaves	
19.	<i>Vitex negundo</i>	Nishinda	Leaves	
20.	<i>Colocasia fallax</i>	Kala Kachu	Leaf with Long Petiole	
21.	<i>Curcuma amada</i>	Kachulote	Rhizome	
22.	<i>Curcuma longa</i>	Haldi	Rhizome, Leaves	
23.	<i>Cyndon dactylon</i>	Durbaghas	Whole Plants without roots	
24.	<i>Musa paradisiaca</i>	Athia Kala	Ripe Fruit	
25.	<i>Mersilea quadrifolia</i>	Amrul	Leaves	

Table 17: List of the medicinal plants from Cooch Behar district

18. Murshidabad

Sl No.	Scientific Name	Local Name	Used part	References
1.	<i>Aegle marmelos</i>	Bel	Stem, Bark, Leaf, Fruit	(Mistry,2015)
2.	<i>Ocimum santum</i>	Tulsi	Leaf	
3.	<i>Cynodon dactylon</i>	Durva	Whole plant	
4.	<i>Catharanthus roseus</i>	Nayantara	Leaf, Roots, Buds	
5.	<i>Euphorbia nerifolia</i>	Manasa	Leaf, Stem	
6.	<i>Rauwolfia serpentina</i>	Sarpagandha	Root, Leaf	
7.	<i>Alocasia macrorrhiza</i>	Man-Kachu	Stem	
8.	<i>Andrographis paniculata</i>	Kalmegh	Leaf	
9.	<i>Coccinia grandis</i>	Tala Kochu	Leaf	
10.	<i>Achyranthes aspera</i>	Apang, Chatchota	Root	
11.	<i>Amaranthus spinosus</i>	Kanta Nate	Root	
12.	<i>Eclipta prostrate</i>	Bhringraj	Leaf	
13.	<i>Leucas ephalotes</i>	Dandakolos	Whole plant	
14.	<i>Oxalis corniculata</i>	Amarul	Whole Plant	
15.	<i>Acacia nilotica</i>	Babla	Latex, Leaf	
16.	<i>Bombax ceiba</i>	Shimul	Root	
17.	<i>Cajanus cajan</i>	Arhar	Leaf	
18.	<i>Centella asiatica</i>	Thankuni	Leaf	
19.	<i>Chromolaena</i>	Asam Lata	Leaf	
20.	<i>Paederia scandens</i>	Gadal	Leaf	
21.	<i>Enydra fluctuens</i>	Helencha	Leaf	
22.	<i>Abroma augusta</i>	Ulatkambal	Leaf	
23.	<i>Tinospora cordifolia</i>	Gulancha	Stem	
24.	<i>Moringa oleifera</i>	Sajina	Leaf	
25.	<i>Scoparia dulcis</i>	Jasthimadhu	Leaf	
26.	<i>Psidium guajava</i>	Peyara	Leaf	
27.	<i>Physalis peruviana</i>	Fatki	Root	
28.	<i>Piper longum</i>	Pipul	Fruit	
29.	<i>Justicia adhatoda</i>	Basak	Leaf	

Table 18: List of the medicinal plants from Murshidabad district

19. Malda

Sl No.	Scientific Name	Local Name	Used Parts	References
1.	<i>Andrographis paniculata</i>	Kalmegh	Leaf, Root	(Mukherjee & Moktan ,2021)
2.	<i>Bacopa monnieri</i>	Brahmi	Leaf with young shoot	
3.	<i>Carica papaya</i>	Popita	Fruit, Latex	
4.	<i>Colocasia esculenta</i>	Man-Kachu	Leaf	
5.	<i>Combretum indicum</i>	Myerju baha	Bark	
6.	<i>Euphorbia sp.</i>	Monosa	Whole plant, Latex	
7.	<i>Ficus racemose</i>	Dumur	Fruit	
8.	<i>Heliotropium indicum</i>	Haatishur	Leaf, Whole plant	
9.	<i>Justiça adhatoda</i>	Basak	Leaf	
10.	<i>Ocimum gratissimum</i>	Ram Tulsi	Leaf	
11.	<i>Solanum surattense</i>	Kata begun	Root, Leaf, Fruit	

Table 19: List of the medicinal plants from Malda district

3.1 Plant parts used:

As per our observation different part of medicinal plant such as root /rhizome, leaves, whole plant, bark, and seed were the commonly used parts in natural preparation in traditional medicine with a percentage of 27%, 20%, 15%, 14% and 10% respectively as reported in the present review work. Stem, flower/ inflorescence, latex, tuber was also contained with a low percentage. (Fig. 14).

3.2 Preparation method of plant drugs:

According to our review report, the commonly used preparation methods of plant drugs in West Bengal alternative medicine were decoction and infusion. Maceration at room temperature, powder mixed with honey-milk-oil, cooked, uncooked plants and external use were also documented.

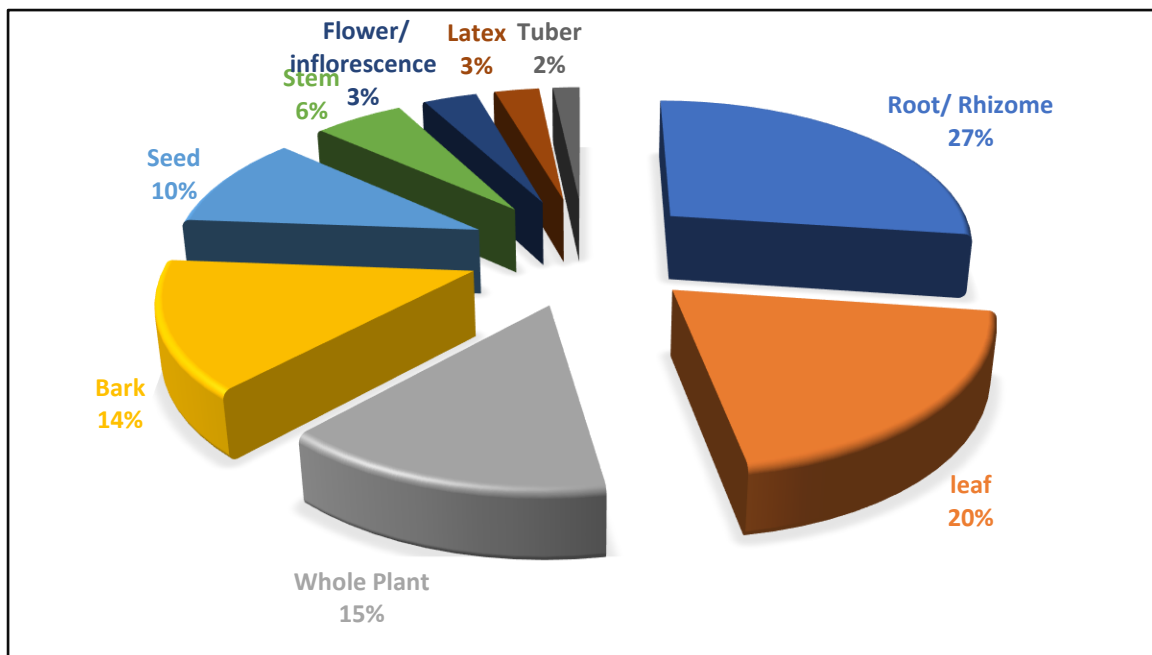


Fig.14. Percentage distribution of plant parts used by the people of West Bengal

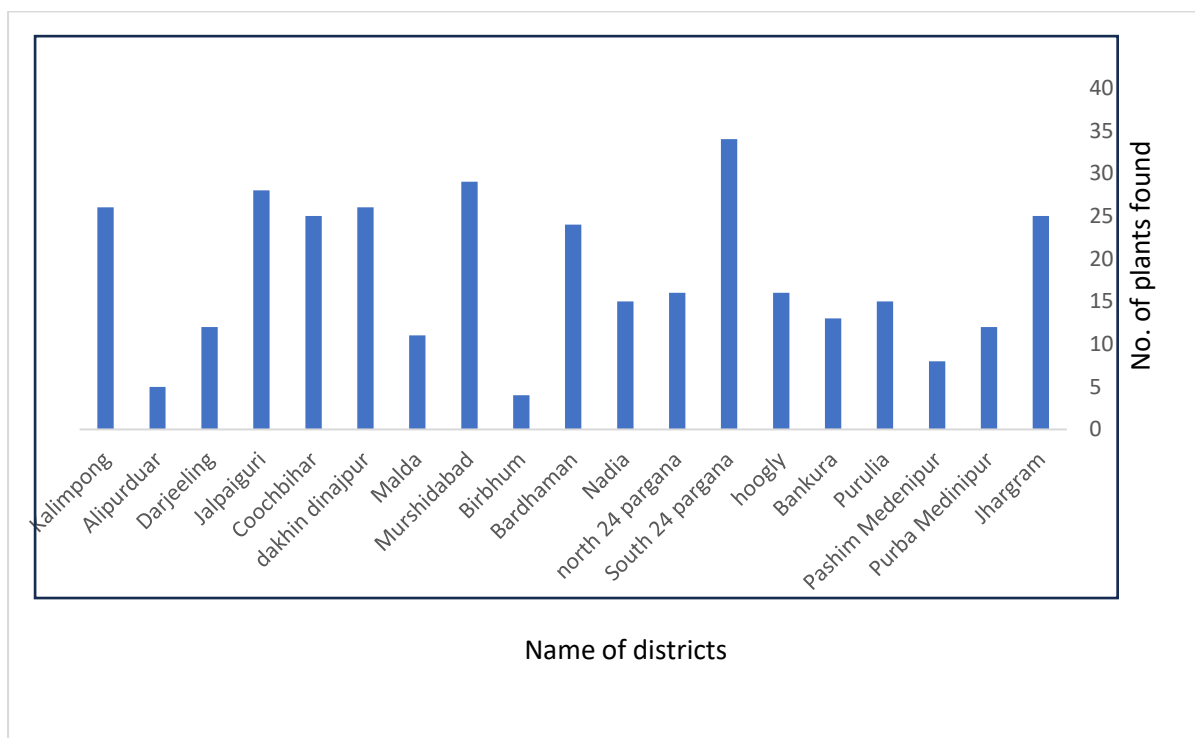


Fig.15. Districts with no. of medicinal plants found

4. Conclusion:

The present work would provide vital information for future conservation of medicinal plants used for respiratory disease used taxa against various types of respiratory related diseases and at the same time it would also help in providing necessary information on different ethnic communities living together in association with rich biodiversity of the area exploring the medicinal plants used in primary health care. This communication could provide significant baseline information for policy makers towards biodiversity conservation and community development. The review highlights the rich tradition of utilizing medicinal plants for respiratory diseases in the many districts of West Bengal. Several plant species have been documented as effective remedies, offering promising prospects for further scientific investigation. The integration of traditional knowledge with modern scientific approaches could potentially lead to the development of novel therapeutics for respiratory ailments.

However, it is crucial to conduct rigorous scientific studies to validate the safety, efficacy, and mechanisms of action of these medicinal plants. Collaborative efforts between traditional healers, scientists, and healthcare professionals are necessary to bridge the gap between traditional knowledge and evidence-based medicine. Furthermore, the conservation of local biodiversity and traditional knowledge systems should be prioritized to ensure the sustainable use of medicinal plants for respiratory health.

This review serves as a valuable resource for researchers, healthcare practitioners, and policymakers interested in traditional medicine and the potential of medicinal plants in managing respiratory diseases. By recognizing and supporting the integration of traditional medicine, we can foster a holistic approach to respiratory healthcare and improve the well-being of individuals in West Bengal and beyond.

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